In the Claims:

1. (Currently Amended) Device for detecting an environmental influence [[(15)]] on a sensor [[(5),]] by ~~means of~~ detecting a change [[in]] of an electrical conductivity of a sensor layer [[(3)]] of [[the]] a sensor ~~(5), whereby~~ , wherein the sensor [[(5)]] has [[a]] first [[7)]] and a second [[(9)]] excitation ~~electrode~~electrodes, a piezoelectric material [[(11)]] arranged between the first and second excitation electrodes, and [[a]] the sensor layer, ~~(3), which comprises: an excitation unit for generating electrical potentials (13), which are passed to the piezoelectric material by way of the first (7) and the second (9) excitation electrode, whereby the sensor layer (3) rests~~the sensor layer having sections that lie against both ~~at least one~~the first excitation electrode and the piezoelectric material, ~~at least in certain regions, and the sensor layer (3) has a conductivity that is dependent on environmental influences,~~ the device further comprising an excitation unit for the generation of electrical potentials which are conveyable to the piezoelectric material via the first and the second excitation electrodes so that the piezoelectric material ~~can be excited~~is excitable to ~~vibrate~~vibrations by ~~means of~~ the excitation electrodes and the sensor layer ~~(3), wherein~~ , and a frequency measurement device to measure the vibrations of the piezoelectric material ~~(17) makes it possible~~,
wherein the sensor layer is made of an oxide ceramic, a non-oxide ceramic or a semiconductor material, a conductivity change modifying the effective electrode surface by a region of the sensor layer, and
wherein the resonance frequency of a vibration order of the piezoelectric material (11) is detectable by the frequency measurement device.

2. (Currently Amended) Device according to claim 1, wherein the excitation unit ~~(13) is formed by means of an oscillation~~comprises an oscillator circuit or a network analyzer.

3. (Currently Amended) Device according to claim 1, wherein the ~~excitation electrode is formed from~~first and second excitation electrodes are one of a metal, a non-oxide ceramic, an oxide ceramic, or a precious metal.

4. (Currently Amended) Device according to claim 1, wherein the first excitation electrode lies directly against the piezoelectric material.

5. (Currently Amended) Device according to to claim 1, wherein the first excitation electrode [[(7)]] lies against the piezoelectric material with an area that is as large as an area with which the second excitation electrode [[(9)]] lies against the piezoelectric material.

6. (Currently Amended) Device according to claim 1, wherein the first excitation electrode [[(7)]] lies against the piezoelectric material with an area that is larger than or smaller than an area with which the second excitation electrode [[(9)]] lies against the piezoelectric material.

7. (Currently Amended) Device according to claim 1, wherein the excitation electrode(s) lie(s) against the piezoelectric material with a circular area.

8. (Currently Amended) Device according to claim 1, wherein the first excitation electrode ~~(7) has a same geometry as the second excitation electrode (9).~~has the same geometry as the second excitation electrode.

9. (Currently Amended) Device according to to claim 1, wherein the piezoelectric material is formed from a quartz, from langasite, its isomorphous compounds, or from gallium orthophosphate, or is a piezoelectric material that is capable of functioning [[even at]] at temperatures up to 1000°C.

10. (Currently Amended) Device according to claim 1, wherein the piezoelectric material ~~has the basic shape of a cylinder~~is cylindrically shaped.

11. (Currently Amended) Device according to claim 1, wherein the sensor layer [[(3)]] lies directly against the [[at least one]] first excitation electrode and/or the piezoelectric material.

12. (Currently Amended) Device according to claim 1, wherein the sensor layer [[(3)]] is configured in circular shape.

13. (Currently Amended) Device according to claim 1, wherein the sensor layer ~~(3)~~ ~~contains oxide ceramics, non-oxide ceramics, semiconductors, organic synthetic or natural polymers,~~comprises ZnO, ZnS, ~~Ti02~~TiO_2, Se, ~~Ce02,~~ CeO_2, or oxides of transition metals~~, proteins or nucleic acids.~~.

14. (Currently Amended) Device according to claim 1, wherein the frequency measurement device [[(17)]] comprises a frequency counter.

15. (Original) Device according to claim 1, wherein the vibration order is the first, third, fifth, or higher.

16. (Currently Amended) Method for detecting an environmental influence ~~(15) on a sensor by means of detecting a change in the electrical conductivity of a sensor layer (3) of the sensor, using a device according to claim 1, which comprises the following steps:~~ on a sensor having a first and a second excitation electrode, a piezoelectric material arranged between the first and the second excitation electrode, and a sensor layer having sections that lie against both the first excitation electrode and the piezoelectric material, wherein the sensor layer is made of an oxide ceramic, a non-oxide ceramic, or a semiconductor material, a conductivity change thereof modifying the effective area of the electrode by an area of the sensor layer through which area the piezoelectric material is excitable to vibrate, the method comprising the steps:

1. ~~generation of a fundamental tone~~generating a fundamental mode in the piezoelectric material,

2. ~~measurement of~~measuring the resonance frequency of the vibration order of step_1.

3. ~~Exerting an environmental influence (15) on~~exposing the sensor layer to an environmental influence ~~(3), causing~~whereby the conductivity of the sensor layer ~~(3) to be~~ is changed ~~and thereby causing the frequency spectrum of~~ the ~~piezoelectric material to be changed~~to change the effective electrode area of the first excitation electrode,

4. ~~Measuring the~~measuring a vibration order of the piezoelectric material after ~~exertion of the~~exposure of the sensor layer to the environmental influence,

5. ~~Calculating~~calculating a resonance frequency difference ~~that is~~ formed [[from]] by the difference [[of]] between the resonance frequency of the vibration order [[of]] in step 1 and the resonance frequency of the vibration order after ~~changing~~ exposure of the sensor layer to the environmental influence, and

6. ~~Correlating the extent of the environbmental influence (15)~~ correlating the extent of environmental influence with the resonance frequency difference.

17. (Currently Amended) Method according to claim 16, wherein ~~upper harmonics are also generated and measured in the piezoelectric material, which~~said measuring further measures higher order harmonics and said higher order harmonics are used in said correlating. ~~are also taken into consideration in detecting the type or the extent of the environmental influence (15).~~

18. (Currently Amended) Method according to claim [[16]]17, wherein said correlating uses the ~~the resonance frequencies of the upper~~higher order harmonics ~~serve~~ for a temperature compensation of the vibration ~~behavior~~behaviour of the piezoelectric material.

19. (Currently Amended) Method according to claim 16, wherein ~~exerting~~ exposing the sensor layer to an environmental influence [[(15)]] comprises irradiation of the sensor layer [[(3)]] with ~~high-energy~~an energetic radiation.

20. (Currently Amended) Method according to claim 16, wherein the environmental influence ~~(15) is the effect of~~ is a chemical or biological substance~~ on the sensor layer (3)~~, or a temperature change.

21. (Currently Amended) Method according to claim 16, wherein ~~signals that run periodically, particularly rectangular, sine, or triangular signals,~~periodic signals are passed to the piezoelectric material by the excitation unit [[(13)]].

22. (Currently Amended) Arrangement of a device according to claim 1 which forms a first sensor, characterized by a second sensor for the detection of an environmental influence, wherein the second sensor has a first and a second opposite excitation electrode, a piezoelectric material arranged between these, and a sensor layer which at least in sections covers but which does not exceed the second excitation electrode, and wherein the sensor layer is formed of an oxide ceramic, non-oxide ceramic, or a semiconductor material, wherein the sensor layer is arranged such that the piezoelectric material is exclusively excitable to vibrations by the excitation electrodes, and the resonance frequency of a vibration order of the piezoelectric material is detectable by a frequency measurement device.~~Arrangement (23) of a first sensor (50) and a second sensor (5u) for detecting an environmental influence (15), whereby the first sensor (50) has a first (7) and an opposite second (9) excitation electrode, a piezoelectric material (11) disposed between these, and a sensor layer (3) that covers the first excitation electrode (7) and also the piezoelectric material (11) at least in certain regions, and the sensor layer (3) has a conductivity that is dependent on environmental influences (15), so that the piezoelectric material (11) can be excited to vibrate by means of electrical potentials from the~~

~~excitation unit for generating electrical potentials (13), both by way of the excitation electrodes (7, 9) and by the sensor layer (3), and the resonance frequency of a vibration order of the piezoelectric material (11) can be detected by means of a frequency measurement device (17), and the second sensor (5u) has a first (7) and an opposite second (9) excitation electrode, a piezoelectric material (11) disposed between these, and a sensor layer (3) that covers the excitation electrode (9) at least in certain regions, but does not exceed it, and the sensor layer (3) has a conductivity that is dependent on environmental influences (15), whereby the sensor layer (3) is disposed in such a manner that the piezoelectric material (11) can be excited to vibrate exclusively by means of the excitation electrodes (7, 9), and the resonance frequency of a vibration order of the piezoelectric material can be detected by means of a frequency measurement device (17)~~.

23. (Currently Amended) Arrangement according to claim 22, wherein the piezoelectric material ~~(11) in the first sensor (5o) is identical with that of the second sensor (5u)~~of the first sensor is identical with the piezoelectric material of the second sensor.

24. (Currently Amended) Arrangement according to claim [[22]]23, ~~wherein the materials of which the excitation electrodes of the first and second sensor (50, 5u) consist~~wherein material of the electrodes of the first and second materials are identical.

25. (Currently Amended) Arrangement according to claim [[22]]23, wherein the material ~~of which~~constituting the sensor layer [[(3)]] of the first sensor ~~(50) is formed~~ is identical with the second material ~~of which~~constituting the sensor layer [[(3)]] of the second sensor ~~(5u) is formed~~.

26. (Currently Amended) Arrangement according to claim [[22]]23, wherein the geometry in which the sensor layer [[(3)]] of the first sensor [[(50)]] is shaped

is identical with the geometry in which the sensor layer [[(3)]] of the second sensor [[(5u)]] is shaped.

27. (Currently Amended) Sensor device [[(25)]] for detecting an environmental influence [[(15)]], having~~ a first (7) and~~ a first and a second [[(9)]] excitation electrode, a piezoelectric material [[(11)]] disposed between these, and a sensor layer~~ (3), whereby~~, wherein the first excitation electrode [[(7)]] is disposed on a first side of the piezoelectric material [[(11)]], and the second excitation electrode [[(9)]] is disposed on the opposite, second side of the piezoelectric material, and the sensor layer [[(3)]] lies against the first excitation electrode [[(7)]] with a first partial area A1, and against the piezoelectric material [[(11)]] with a second partial area A2, and the sensor layer [[(3)]] has a conductivity that is dependent on environmental influences, so that the piezoelectric material [[(11)]] can be excited to vibrate by means of electrical potentials from an excitation unit for generating electrical potentials-[[(13)]], both by way of the excitation electrodes [[(7, 9)]] and ~~by the sensor layer (3), and the resonance frequency of a vibration order of the piezoelectric material (11) can be detected~~ by the sensor layer, and the resonance frequency of a vibration order of the piezoelectric material can be detected by means of a frequency measurement device [[(17)]], and a third excitation electrode [[(27)]] is disposed on the second side of the piezoelectric material, which lies against the piezoelectric material [[(11)]] with an area A3, which is at least as large as the partial area A2 of the sensor layer [[(3)]] and, if this partial area A2 is projected onto the area A3, the partial area A2 is completely covered by the area A3, and the first, second[[,]] and third excitation ~~electrode~~electrodes are electrically connected with a switching means [[(29)]] that connects the second [[(9)]] and third [[(27)]] excitation electrode in an electrically conductive manner in a first switching position, so that the conductivity of the sensor layer [[(3)]] can be detected, and the switching means [[(29)]] connects the first and third excitation electrode ~~(27) in~~ in an electrically conductive manner in a second

switching position, so that the change in the vibration properties caused by the deposit of a substance of the environmental influence can be measured.

28. (Currently Amended) Sensor device according to claim 27, wherein the first excitation electrode [[(7)]] is formed in the shape of a circular disk on one side of the piezoelectric material.

29. (Currently Amended) Sensor device according to claim [[27]]28, wherein the ~~second~~first excitation electrode [[(9)]] is formed in the shape of a circular [[disk]] disc on one side of the piezoelectric material. and the third excitation electrode [[(27)]] is formed in the shape of a circular ring [[(31)]].

30. (Currently Amended) Sensor device according to claim 27, wherein the sensor layer [[(3)]] lies directly against the first excitation electrode and is circular.

31. (Currently Amended) Sensor device according to claim 27, wherein the piezoelectric material is formed in the shape of a cylinder [[(19)]], whereby the first, second, and third excitation electrode [[(27)]] as well as ~~the piezoelectric material and~~ the piezoelectric material have a common axis of symmetry.

32. (New) Method according to claim 21, wherein the periodically running signals are rectangular, sine, or triangular signals.

33. (New) Arrangement of a device according to claim 1 which forms a first sensor, characterized by a second sensor for the detection of an environmental influence, wherein the second sensor has a first and a second opposite excitation electrode, a piezoelectric material arranged between these, and a sensor layer which at least in sections covers but which does not exceed the second excitation electrode, and wherein the sensor layer is formed of an oxide ceramic, non-oxide ceramic, or a semiconductor material, wherein the sensor layer is arranged such that the piezoelectric material is exclusively excitable to vibrations by the excitation electrodes, and the resonance frequency of a

vibration order of the piezoelectric material is detectable by a frequency measurement device.

34. (New) Arrangement according to the claim 33, characterized in that the piezoelectric material of the first sensor is identical with that of the second sensor.

35. (New) Sensor device according to claim 28, wherein the second excitation electrode is formed in the shape of a circular disc, and the third excitation electrode is formed in the shape of a circular ring.